VISION OF COMPLETELY MAGNETIZED 8 MeV COOLER

12 x 700 kV device (drawing by V. Reva, 2015)

from cooling section
to cooling section
insulators
gas turbines
gun
collector
layout of the HESR electron cooler

History
- preliminary studies for COSY cooler
- COSY cooler works fine since commissioning
- COSY design was adapted to new tasks at HESR
- in 2016, BINP was commissioned to build a prototype

RELIABILITY TESTS OF TURBINES AT MAINZTURBINES

results and conclusions
- turbine operated > 1000 h without failure at 5 kW
- lubrication of bearings is needed, but minimal
- lubrication unit is modified for 10 bar external pressure
  - successful test of turbine in pressurized vessel in autumn 2015
- closed cycle operation with dry nitrogen seems favorable – test next year
- turbine with gas bearings has been developed by DEPRAG
- turbine powered prototype under construction at BINP
- demonstration of 600 kV Turbo-HV-Generator + solenoid – summer 2018

ASSEMBLY OF 600 kV TURBINE DRIVEN HV GENERATOR

insulators
cascade transformer
electronics
gas inlet tube
turbine
gas outlet tube
compressor
4 bar outlet pressure
enough mass flow to serve up to three turbines
outlet gas temperature 150°C
heat exchanger enables to adjust temperatures between 30°C and 150°C

space for test bench
compressor
water cooled heat exchanger
solenoid

FURTHER DEVELOPMENTS AND IDEAS

status end of 2018
- commissioning of HV module
- powering the solenoid at HV

first possibility
- install a gun and beam diagnostic
- further parameter characterization

second possibility
- install a 2nd HV module
- increase potential to 1.2 MV
- further parameter characterization

third possibility
- install necessary solenoids
- install beam recirculation
- produce high electron current
- check if all parts work together

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